REMARKS

Claims 1-39 are pending and were rejected under 35 USC §103(a) as unpatentable over Hui (U.S. Patent No. 6,654,417) ("Hui") in view of Hurst (U.S. Patent No. 6,763,067) ("Hurst") and further in view of Werner et al. (U.S. Patent No. 6,668,088) ("Werner").

On July 8, 2009, in a telephone interview, the Examiner and the undersigned attorney discussed the rejections based on Hui (U.S. 6,654.417 B1) and Hurst (U.S. 6,763,067) and Werner (U.S. 6,668,088). The Examiner agreed that claims 2, 17, 25 and 33 are allowable in view of the art of record, and invited Applicants to place additional comments on the record concerning the rejection of the remainder of the claims.

The invention of claim 1 relates to robust single-pass variable bit rate video encoding of a video sequence. For example, as amended, claim 1 (in part) recites:

> for each frame of the video sequence, performing the following steps:
> > allocating a number of bits to the frame;
> > **determining a quant with which to encode the frame, the quant being a function of at least the buffer's fullness, a base quant envelope and a base quant envelope control associated with the frame, wherein the base quant envelope and the base quant envelope control are based on the type of the frame, and the fluctuation of the base quant envelope is controlled by the base quant envelope control;**
> > encoding the frame according to the determined quant;
> > outputting the encoded frame; and
> > updating the fullness of the buffer based on any over/underused bits for the frame.

The Examiner previously indicated that the claimed invention is patentable over the combination of Hui and Hurst, and in the most recent Office Action acknowledges that the

20

combination of those references does not disclose at least the claim element related to determining a quant for encoding a frame. The Examiner depends on Werner to disclose the claimed feature. However, Werner does not remedy the deficiencies of Hui and Hurst.

Werner discloses a parameter λ for quantizing transform coefficients of a digital signal (Abstract and 2:11-25). Werner partitions the range of a value into a set of adjacent intervals and maps the set of intervals into a set of representation levels using the parameter λ (1:60-67). By comparison, in the MPEG2 reference coder, λ has a fixed value (i.e., $\lambda = 0.75$). In Werner, the parameter λ varies (Abstract and 1:55-60).

The Examiner cited column 2, lines 10-30, column 3, lines 15-20 and column 4, lines 10-25 as disclosing the claimed quant determination. However, these portions of Werner do not disclose the claimed feature because these portions of Werner merely describe varying the parameter λ. For example, column 2, lines 10-25 of Werner discloses that the parameter λ can be a function of the quantity represented by the value (i.e., the representation level of a bound of each interval); or a function of horizontal and vertical frequency in case of DCT transformation; or a function of the quantization step size; or a function of the amplitude of the value. In column 3, lines 15-20, Werner merely describes the parameter λ as a function of the quantity represented by the value (i.e., a given representation level r_i) in a mathematical format (e.g., equations 1 and 2). Column 4, lines 10-25 of Werner merely describes adding a fixed number $\lambda / 2$ to weighted incoming coefficients. Varying the parameter λ as disclosed in Werner does not disclose or teach determining a quant as claimed. Further, none of these λ functions discloses or teaches a quant determined as a function of at least the buffer's fullness, a base quant

21

envelope and a base quant envelop control, let alone determining the quant based on the type of the frame to be encoded as claimed.

The Examiner further cited column 14, lines 40-50 of Werner as disclosing the type of frame for quant determination. However, Werner does not disclose a quant determination based on the type of the frame because Werner merely discloses the quantization scheme of intra DCT coefficients (4:1-5). Column 14, lines 40-50 of Werner describes "a promising goal" of adapting quantization using the λ parameter for transcoding of MPEG-2 inter-frames (i.e., P- and B-frames) in the future work, and Werner does not disclose how to adapt the disclosed quantization scheme (for intra frames) to other frame types here or elsewhere within the specification.

Thus, claim 1 is patentably distinguishable over the cited references.

Independent claims 16, 24 and 32 recite similar language as claim 1. For at least these reasons, independent claims 16, 24 and 32 are patentable over the cited references, and the rejection should be withdrawn.

The dependent claims are also patentable over the cited references, both because each depends from patentable independent claims, and because each also recites its own patentable features.

The Examiner is invited to contact the attorney listed below in order to advance prosecution.

Respectfully submitted,
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22

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